NATURAL RESOURCES CONSERVATION SERVICE

CONSERVATION PRACTICE STANDARD

WELL DECOMMISSIONING

(No.)

CODE 351

DEFINITION

The sealing and permanent closure of a water well no longer in use.

PURPOSE

This practice serves to:

- Prevent entry of animals, debris, or other foreign substances into well or well bore hole;
- Eliminate the physical hazard of an open hole to people, animals, and farm machinery;
- Prevent entry of contaminated surface water into well and migration of contaminants into unsaturated (vadose) zone or saturated zone;
- Prevent commingling of chemically or physically different ground waters between separate water bearing zones;
- Eliminate possibility of well being used for any other purpose;
- Conserve yield and hydrostatic head of aquifers;
- Restore, as far as feasible, hydrogeologic conditions that existed before well was constructed.

CONDITIONS WHERE PRACTICE APPLIES

This practice applies to any drilled, dug, driven, bored, or otherwise constructed vertical water well determined to have no further beneficial use, is no longer used, or is in such a state of disrepair that using it to obtain ground water is impractical or a health hazard.

This practice does not apply to water wells that were used for waste disposal.

CRITERIA

Closure options shall be compatible with all applicable Federal, State, and Local requirements.

A water well abandoned prior to January 1, 1988, maybe plugged by the landowner. Water wells abandoned on or after January 1, 1988, must be plugged by an Indiana licensed water well driller.

Data collection. As-built construction documents, maintenance records and other available data for the abandoned water well shall be collected, reviewed and applied toward the development of a well decommissioning plan. Existing conditions shall be documented as defined in Plans and Specifications.

Well preparation. The well shall be cleared of all pumping equipment, valves, pipelines, casings, liners, screens, grease, oil, scum, debris, and other foreign material, to the extent possible.

Disinfection. Before sealing, the entire column of well water shall be brought to an available chlorine concentration of 100 ppm or greater, or other solution specified by local or state requirements. After being agitated in the well water, the chemical solution shall be left for no less than 24 hours to assure complete disinfection.

Plugging materials. Plugging materials do not require disinfection.

Water to be mixed with plugging materials shall be compatible with the material, and shall be of a quality that will not result in contamination of

the well or water-bearing zones penetrated by the well.

Placement of plugging materials. Cement and bentonite slurries shall be pumped into place with a grout pipe from the bottom of the well and moving the pipe progressively upward as the well is filled. Pelletized, coarse grade or medium grade crushed bentonite shall be installed in the well by gravity methods in a manner to prevent bridging of the plugging material within the well.

Fill material. Fill material shall be clean and free of organic or other foreign matter. The gradation shall be such that bridging will not occur during placement.

Placement of fill material. When allowed by law, fill materials, such as sand, pea gravel, sand-gravel mix, crushed stone, or agricultural lime can be used to plug a portion of the well. Fill material shall be placed into the well only after the well water has been disinfected. All material shall be placed from the bottom of the well upward by methods that avoid segregation, dilution, or bridging of the material.

For wells greater than 30 inches in diameter, backfill shall be placed and compacted in a manner that minimizes segregation to prevent surface subsidence.

Surface seal. After completion of or during the process of well plugging, the well casing shall be severed at least two (2) feet below the ground surface, and a cement plug larger in diameter than the borehole shall be installed.

The interval between the ground surface and the top of the concrete plug shall be filled with soil material that achieves an in-place hydraulic conductivity equivalent to or less than the surface soil surrounding the well. The ground surface at the sealed well site shall be mounded and graded in a manner that prevents ponding of surface runoff.

Control of elevated formation pressure. If a well penetrates a formation that is under artesian head (confined conditions), or from which a gas is being released under pressure, the grout pressure must be maintained greater than the formation pressure until initial grout set occurs. Procedures for balancing formation pressures during grouting operations shall conform to ASTM D5299 (Standard Guide for Decommissioning of Ground Water Wells, Vadose Zone Monitoring Devices, Boreholes, and Other Devices for Environmental Activities).

Removal or grouting in place of well casing.

If required, the well casing shall be completely removed from the well by either pulling or overdrilling (overreaming) as explained in ASTM D5299.

If necessary, casing that cannot be removed completely shall be ripped, perforated, or cut off at a depth greater than the maximum potential for frost penetration or any other near surface soil fracturing hazard (such as desiccation), or three feet, whichever is greater. Perforated or ripped casing shall provide sufficient apportioned open area to assure passage of the grout into the space. The casing shall be perforated or ripped throughout the entire length of a confining layer. Casings to be grouted in place shall employ a pressurized grouting procedure that will completely fill and seal the open space around the casing.

Casings to be removed from a collapsing formation shall be grouted concurrently with removal such that the bottom of the casing remains submerged in the grout.

CONSIDERATIONS

This practice may be part of a ground water protection system that includes water and chemical management practices.

To the extent practicable, an abandoned well should be decommissioned in a manner that restores the original hydrogeologic conditions of the well site and does not preclude the use of the site from future land management practices.

All decommissioning procedures, fill and sealing materials need to be selected with due consideration of the site-specific geological, biological, physical, and climatic conditions; the chemical composition of the surrounding soil, rock, and ground water at the well site; and the well's construction practices. Water well drilling records may be available from the IDNR Division of Water.

PLANS AND SPECIFICATIONS

Plans and specifications for decommissioning abandoned water wells shall be consistent with this standard and shall describe the

requirements for applying the practice to achieve its intended purposes. A record of the installation of this practice shall be made and shall include the following information:

- Location of the decommissioned well by street address, latitude/longitude, township/range, or other georeference convention, of such precision that it can be readily located in the field, if required, in the future;
- Date of completion of well decommissioning;
- Name of landowner;
- Name, title, and address of person responsible for well decommissioning;
- Total depth of well;
- Age of well, if known;
- Installation method (i.e. drilled, driven, jetted, bucket, dug);
- Length of casing (if known);
- Length of well screen (if known);
- If applicable, length of casing removed or length of casing cut off below ground level;
- Inside diameter of well bore or casing;
- Type of casing material or schedule (e.g., standard weight steel, or PVC Sch-80);
- Static water level measured from ground surface prior to decommissioning;
- Types of materials used for filling and sealing, quantities used, depth intervals for emplacement of each type, and emplacement method used.

Notification requirements. The Indiana Department of Natural Resources, Division of Water shall be notified in writing of a well abandonment within thirty (30) days after plugging is completed. Indiana licensed water well drillers shall report well abandonment on forms provided by the Department.

OPERATION AND MAINTENANCE

The practice site shall be inspected periodically to ensure that the decommissioned well and the adjacent area have not settled or eroded, or are otherwise adversely disturbed. The well site and adjacent ground surfaces shall be maintained in a manner that prevents ponding of surface runoff on the site.

REFERENCES

Listed below are references helpful in planning this practice:

- Indiana Code 25-39
- Rule 312 IAC 13-10
- ASTM D5299, Standard Guide for Decommissioning of Ground Water Wells, Vadose Zone Monitoring Devices, Boreholes, and Other Devices for Environmental Activities.
- Purdue University Cooperative Extension Service Publication
  - Plugging Abandoned Water Wells: A Landowner's Guide, 1998 (WQ-21)
- Indiana Department of Natural Resources
  Division of Water
  402 W Washington St Rm W264
  Indianapolis, IN 46204
  (317) 232-4160
- Indiana Groundwater Association
  7829 Prairie View Drive
  Indianapolis IN 46256
  (317) 596-9760